pens to need it, if a definite system of communication and exchange were established between the laboratories.

Such a system will now be put in operation by the newly formed Association of American Chemical Research Laboratories, of which I have been elected secretary for the academic year 1909–10. A number of the more important chemical research laboratories, including those of Harvard University, the University of Chicago, the University of Illinois, Columbia University, the Massachusetts Institute of Technology, Brown University, the University of Toronto, and others, have already joined the association, and other laboratories are welcome to join at any time. Each laboratory desiring to join the association should send to the undersigned a copy of Kahlbaum's or some similar catalogue, with marks on the margins showing what chemicals, and roughly what quantities of them, are contained in its stock. If a preparation is needed by any member of the association, inquiry is sent to the secretary, who will return information as to where and in what quantities the chemical is to be found. Every member of the association is pledged to loan to any other member any chemical which he does not immediately need himself. On the other hand, a member borrowing a preparation is pledged to order it from abroad and to return it without undue delay to the laboratory from which it has been borrowed.

The warm approval with which the plan met when presented at the Clark University conference would seem to justify all hope for its complete success.

M. A. Rosanoff

Clark University,
Worcester, Mass.,
October 12, 1909

## FAMILY RECORDS

To the Editor of Science: Last spring I asked, through Science, for volunteers from among American men of science to furnish records of certain characteristics of their families for three or more generations. The response was unexpectedly large and a valuable lot of data was acquired that is now being worked up. Much more data could, however, be used to advantage and so I make this second call for volunteers. Two sets of blanks will be furnished to each person desiring them, of which one may be retained for personal use. Information is asked concerning some 35 characteristics of each individual recorded so that the task of filling the blanks is not inconsiderable. It appears that in many families the data asked for can be obtained by taking a little trouble and the indications, so far, are that the trouble is well worth while.

It would be a great help if those who have quite or nearly filled out the "Family Records" that they received last spring should return them to me as soon as convenient.

C. B. Davenport

Cold Spring Harbor, N. Y.

## SCIENTIFIC BOOKS

*The Plankton of the Illinois River, 1894–1899.* Part II. *Constituent Organisms and their Seasonal Distribution.* By C. A. Kofoid. Bull. Ill. State Lab. of Nat. Hist., Vol. VIII., Article I., 361 pp., 5 pl., May, 1908.

This is the second volume based on the plankton investigations made by Professor Kofoid on the Illinois River. It gives the results of quantitative, numerical and qualitative studies made on plankton material which was collected in the channel waters, chiefly at weekly intervals, during the years 1894 to 1899.

As a result of the commingling of organisms from various and diverse sources, the plankton of this river has a markedly composite character, no fewer than 528 forms being represented. Notwithstanding this large number of forms, it still does not show so great a diversity of organisms as marine plankton. Fresh-water plankton is characterized by the almost universal absence of larval forms, the exceptions being the glochidia of the Unionidæ and the larvæ of dipterous insects; by the smaller number of invertebrate groups represented; and by the smaller size of the component organisms. In spite of the smaller number of forms in this

river plankton, however, its quantity was larger than that which has been obtained from the upper strata of the Atlantic Ocean.

The phytoplankton consisted chiefly of algæ and the zooplankton of Protozoa, Rotifera and Entomostraca. Relatively the plants outnumbered the animals nearly five to one. For each of the Cladocera, there were 7 Copepoda, 95 Rotifera, 18,000 Protozoa and 86,000 plants. This large number of plants would furnish an abundant supply of food for the zooplankton.

By far the greater portion of the paper consists of a detailed discussion of the statistical data pertaining to the various constituent organisms, but space will permit the consideration of only the most important of the larger groups. Bacteriaceæ were found throughout the year, but they reached their maximum development in the winter from December to January. They sometimes became a serious menace to the fishing industry as they collected on the fyke nets in such masses that their weight and resistance to the current would break the nets.

The Myxophyceæ also contributed to the phytoplankton throughout the year. Quantitatively this group was not so important as some of the others, owing to the small size of its most numerous member, *Microcystis*. *Rivularia, Glœotrichia* and *Aphanizomenon,* which occur so generally in lakes, were not found in this fluviatile plankton. The Chlorophyceæ were well represented both in species and individuals and showed evidences of their adaptation to the whole range of temperature changes. The group as a whole exhibited maximum periods at approximately monthly intervals. Bacillariaceæ were found in every collection and their seasonal distribution was substantially repeated from year to year. The chief maxima were found in April-May and in November-December, with smaller maxima and minima intervening.

All the collections contained large numbers of Protozoa. The Mastigophora, which consisted chiefly of chlorophyll-bearing Protozoa, were found at all seasons of the year, but four fifths of them came between the first of April and the last of September, or during the season of growth for land flora.

While Rotifera were obtained at all seasons the number was uniformly low in winter. They showed great fluctuations at other seasons. There was an apparent tendency, however, for a vernal and an autumnal maximum. With three exceptions no maxima of any considerable amplitude were found when the temperature of the channel water was below 15.5° C.

The Entomostraca as a group were represented in all collections. The minimum number was found in mid-winter and the maximum for the year in April and May. During the remainder of the year, there was usually a series of recurrent maxima and minima which generally coincided with or approximated such periods in the other plankton organisms and often showed correlations in amplitude.

Cladocera were noted every month of the year, but they did not appear in ten of the collections. The minimum numbers were found during the period of minimum temperatures and the total varied more or less with the hydrographic changes. The Copepoda were, on an average, about five times as numerous as the Cladocera. They were perennial and had a major maximum in April-May with an occasional autumnal maximum of equal or greater proportions. By far the greater proportion of the Copepoda were young, 78 per cent. being nauplii of *Cyclops* and *Diaptomus,* and 13 per cent. immature *Cyclops.*

In the concluding chapter, Professor Kofoid states that one of the most obvious conclusions of his detailed study is that the plankton production was fundamentally rhythmic or periodic in character, viewed either in its constituent elements or as a whole. The exceptions to this rhythm were usually the adventitious forms. The cause of the periodicity was not clearly revealed. It was not correlated with the physical and chemical conditions of the water. The duration interval of the rhythms averaged approximately that of the lunar month, but showed considerable variations, as might naturally be expected, owing to the very large number of environmental factors involved.

Since the maxima of Rotifera and Entomostraca were coincident with or followed closely those of the chlorophyll-bearing organisms upon which they fed, the author reaches the conclusion that the factors which controlled the periodic growths in the food organisms would account for the rhythmic phenomena in the total plankton. If some observations made by Knauthe which seem to indicate that moonlight increases the photosynthetic activities of chlorophyllaceous organisms, and consequently their growth, be accepted, then Professor Kofoid thinks that this recurrent factor of the environment may account for the rhythmic growth of these organisms which results in the production of maxima each month at or near the time of full moon. It may be said, however, that the effect of moonlight on photosynthesis must receive further confirmation before it can be regarded as a factor of appreciable importance in the production of these phenomena.

These studies show that the Illinois River possesses an abundance of plankton material which will serve as food for the higher organisms, and this abundant supply of food material doubtless bears a very important relation to the large production of food fishes for which this stream is noted. It is also interesting to know that plankton work was recently resumed on this river after an interruption of ten years.[1]

C. Juday

Madison, Wis.

*The Theory of Valency.* By J. Newton Friend. London and New York, Longmans, Green & Co. Pp. xiv + 180; crown 8vo, cloth. Price, $1.60.

This little volume is the latest addition to the series of "Text-books of Physical Chemistry" edited by Sir William Ramsay. The first thirteen pages are of the nature of an historical introduction. This is followed by thirty-eight pages devoted to the theory of valency, valency and the periodic law, the valency of carbon, and Thiele's theory. Ten further chapters covering sixty-nine pages are then devoted to a somewhat detailed discussion of the valency of the elements contained in each of the groups of the periodic system. Finally, forty-three pages are taken up in the consideration of Werner's theory, electrochemical theories, and the physical cause and nature of valency. The chapters on the valency of the elements of the various groups of the periodic system are rather tedious reading, and frequently lack completeness and adequacy. Many of the statements and explanations they contain would certainly be challenged by chemists. But it must be remembered that the subject of valency has ever been warmly debated, and it is hardly to be expected that a brief résumé of it would meet general approbation. In the study of the compounds of carbon and also in the investigation and correlation of many other compounds, particularly the simpler ones, the theory of valency has been of inestimable value, and the book does give the reader this impression correctly. On the other hand, in the discussion of variable valency, and the matter of partial valencies, the author has not always been clear. The reader is here left with the idea that these portions of the subject are rather more hazy and indefinite than they actually are. The introduction and the discussion of the various theories of valency form by far the best portions of the book. It is somewhat peculiar that the theory of valency should have been chosen as the subject of a volume of a series of books on physical chemistry, for valency has always been considered as belonging to chemistry proper. As Dr. Friend's book is the only attempt of an exhaustive, systematic treatment of the subject of valency, it will no doubt be useful to mature readers who can read it critically. The various references given, though they are far from complete, will nevertheless serve very well to introduce students to the literature of the subject.

The print, paper and binding of the book are excellent, these features being similar to those of the other volumes of the series.

Louis Kahlenberg

[1] Science, Vol. XXX., p. 55.